TITLE: Machine behavior diagnosing rule developing method for discrete event control system
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BASIC-ABSTRACT: NOVELTY - The timing patterns in the occurrences of discrete events associated with control elements are detected. The diagnostic rule is defined by performing statistical analysis which includes detection of changes in timing patterns and rejection or updation of diagnostic rule in real time based on detected changes .

DETAILED DESCRIPTION - A statistical analysis is performed by calculating the duration of mean time interval and standard deviation from mean time interval. Diagnosing rule of the machine is rejected if the mean time interval duration exceeds a predetermined maximum duration. For repeated timing patterns, the statistical analysis is performed and if newly obtained standard deviation is smaller than predetermined standard deviation, then the diagnostic rule is updated based on detected changes in the timing patterns. The malfunction in the machine behavior is identified by evaluating whether an unexpected event has occurred by identifying whether the result occurs after the trigger event within the mean time interval plus or minus at least one standard deviation.

An INDEPENDENT CLAIM is also included for machine behavior diagnosing rule development system.

USE - For use in discrete event control systems, e.g. automated industrial control system for controlling operation of machine having large number of components.

ADVANTAGE - Since the diagnostic rules are discriminately defined, selected, updated based on machine's discrete event timing patterns. The system and method of diagnosing machine behavior are capable of adapting to operational changes. A malfunction is identified if result event does not occur after the trigger event within at least one standard deviation about mean time interval. This identification of unexpected events, errors and erroneous occurrences of events is possible. Real time changes in behavior of machine due to environmental conditions, natural wear and aging process are diagnosed.

DESCRIPTION OF DRAWING(S) - The figure shows the flowchart- representing exemplary steps for defining, updating, selecting the optimum diagnostic rules for the system.